

What Is Claimed Is:

1. An apparatus for forming a spiral wound endless abrasive article comprising:

5 a hub supported in a cantilevered configuration, the hub having a longitudinal axis and a convex outer surface;

a web feeder adapted to introduce a first web and a second web onto the hub at an angle relative to the axis of the hub, the first and second webs positioned in an offset and overlapping configuration; and

10 a web joiner adapted to join abutting edges of the first web by overlap of the second web as the first and second webs spirally wind about the hub to form a spiral wound article having a circumference greater than the outer surface of the hub.

2. The apparatus of claim 1, wherein the first web and second web are
15 adhered at the overlap of the first web and the second web.

3. The apparatus of claim 1, wherein the web joiner comprises at least one press roller adjustably positioned adjacent the outer surface of the hub, the press roller configured to apply pressure to the first and second webs at the abutting edges
20 of the first web as the first and second webs pass under the press roller.

4. The apparatus of claim 3, wherein the web joiner further comprises a plurality of press rollers, at least one of which is driven to move the first and second webs under the press rollers.
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5. The apparatus of claim 4, wherein the plurality of press rollers comprises two upper press rollers and two lower press rollers forming a nip through which the first and second webs pass.

30 6. The apparatus of claim 3, wherein the web feeder comprises a guide adjustably positioned adjacent the hub outer surface, the guide configured to receive

the first and second webs and position the first and second webs with the abutting edges of the first web beneath the press roller as the first and second webs spirally wind about the hub.

5 7. The apparatus of claim 1, wherein the web feeder is further adapted to introduce a third web on to the hub at the same angle relative to the axis of the hub, the third web positioned in an offset and overlapping configuration relative to the second web.

10 8. The apparatus of claim 7, wherein the web feeder comprises a plurality of web unwinds and a web steering mechanism for positioning at least one of the first, second and third webs at the desired angle relative to the axis of the hub.

 9. The apparatus of claim 8, wherein the steering mechanism comprises
15 an adjustable web steering bar for positioning the first, second and third webs at the desired angle.

 10. The apparatus of claim 8, wherein the steering mechanism comprises
an adjustable web guide that contacts the first web and adjusts the position and angle
20 of the abutting edges of the first web relative to each other.

 11. The apparatus of claim 10, wherein the steering mechanism further
comprises a sensor that senses incorrect positioning of the abutting edges of the first
web.

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 12. The apparatus of claim 11, wherein the sensor comprises feedback
control connected to the web guide for automatic adjustment of web angle and
position.

30 13. The apparatus of claim 7, wherein the hub comprises a first hub and
wherein the apparatus further comprises a second hub adjustably supported in a

cantilevered configuration at a distance from the first hub, the webs passing around the second hub while spirally winding about the first hub to produce a spiral wound article having a desired circumference.

5 14. The apparatus of claim 13, wherein the apparatus further comprises a web driving mechanism that pulls the webs over the hub at the angle relative to the axis of the hub.

 15. The apparatus of claim 14, wherein the web driving mechanism
10 comprises a driven roller.

 16. The apparatus of claim 15, wherein the second hub comprises the driven roller.

15 17. The apparatus of claim 14, wherein the web driving mechanism comprises driven nip rollers.

 18. The apparatus of claim 7, wherein web joiner comprises a heated hub.

20 19. The apparatus of claim 7, wherein the first web comprises a coated abrasive, the second web comprises an adhesive material, and the third web comprises a reinforcing material.

 20. The apparatus of claim 1, wherein the first web comprises a coated
25 abrasive and the second web comprises a splicing media.